

Applicants : Jiri Zapletal et al
Serial No. : 10/714,109
Page No. : 5

REMARKS

Applicant respectfully requests reconsideration of the above-identified patent application. Claims 1-4, 6, and 9-16 are pending in the application. Claims 1, 6, and 9 are amended as discussed during the recent personal interview to more particularly point out and distinctly claim the subject matter that Applicants regard as their invention. In the interest of efficient and expeditious prosecution, claims 5 and 7-8 are cancelled. Applicants respectfully traverse the rejections under 35 U.S.C. 102 and 103 as conceivably applied to the amended claims.

I. Interview

Applicants thank Examiner Hoang for the courtesies extended to Applicants' attorney during the personal interview conducted on March 22, 2005. In the interview, proposed claim amendments were presented and discussed. Those amendments are formally presented herein. While no formal agreement was reached, the Examiner noted that the amended claims would define over the subject matter of the applied references.

II. Invention Summary

As defined in the amended independent claims, the present invention is directed to a plasma arc torch for focusing a transferred plasma arc. The torch includes a nozzle body defining an exit orifice, and a cathode disposed within the nozzle body. The cathode transfers the plasma arc through the exit orifice to a workpiece. The nozzle includes a high heat resistant, electrically conductive metal layer that is electrically insulated from the transferred plasma arc. The layer has a higher melting temperature than the remainder of the nozzle. The nozzle focuses

Applicants : Jiri Zapletal et al
Serial No. : 10/714,109
Page No. : 6

the plasma arc along a central axis as the arc is transferred through the exit orifice to the workpiece.

III. Art Rejections

A. Section 102 Rejection Based on Winterfeldt

As originally filed, claim 1 was rejected under 35 U.S.C. 102 as being anticipated by U.S. Patent 4,954,688 to Winterfeldt.

As discussed in the interview, Winterfeldt is directed to the type of apparatus that the present invention was expressly intended to overcome. Winterfeldt discloses a plasma arc torch that transfers a plasma arc to a workpiece for cutting the workpiece. The torch includes a nozzle that includes a lower portion defining an exit orifice for the plasma arc. This lower portion of the nozzle member is preferably comprised of a ceramic, electrically insulative material, such as alumina. Col. 3, ln. 63-65.

With respect to amended independent claim 1, Winterfeldt does not disclose a plasma arc cutting torch including 1) a nozzle comprised of a first material and a second material, the second material defining the exit orifice and being a high heat resistant, electrically conductive metal, or 2) a nozzle that focuses the plasma arc along a central axis through the exit orifice.

Because Winterfeldt does not disclose every element of amended independent claim 1 Applicants respectfully submit that the rejection of claim 1 under Section 102 is overcome and/or should be withdrawn.

Applicants : Jiri Zapletal et al
Serial No. : 10/714,109
Page No. : 7

B. Section 103 Rejection Based on Winterfeldt in view of Mueller

As originally filed, claims 2-16 were rejected under 35 U.S.C. 103 as being unpatentable over Winterfeldt in view of U.S. Patent 5,897,059 to Muller.

Applicants respectfully submit that Muller and Winterfeldt cannot be combined to achieve the subject matter of the amended claims. As discussed in the interview, Muller is directed to a different plasma arc field, namely plasma spray technology. Unlike the present invention, plasma spray technology operates with a low-power, *non-transferred* plasma arc, wherein the nozzle body itself is used as an anode instead of transferring the plasma arc to a workpiece. Non-transferred plasma arc nozzles have completely different failure modes from those of transferred plasma arc nozzles. Non-transferred plasma arc nozzles generally fail due to the intended contact of a low powered arc with the nozzle/anode during arc-starting and operation. In contrast, transferred plasma arc nozzles generally fail due to the non-intended contact of an operating, high powered plasma arc that is pulled out of focus and thus away from the central axis of the nozzle orifice. With respect to the amended independent claims, neither reference discloses 1) a plasma arc transferred from a cathode to a workpiece through an axial bore along a central axis; 2) a nozzle including a high heat resistant, electrically conductive metal layer defining said exit orifice and electrically insulated from the plasma arc; and 3) focusing the plasma arc through the axial bore along the central axis.

Applicants further submit that there is no motivation or suggestion in the art for combining or modifying Winterfeldt and Muller. In fact, the references teach away from a combination and/or the claimed invention. Muller teaches the use of a high heat resistant metal,

Applicants : Jiri Zapletal et al
Serial No. : 10/714,109
Page No. : 8

tungsten, in a nozzle orifice, but only in connection with a non-transferred plasma arc. Muller nowhere suggests that the application of tungsten would somehow be applicable to the unrelated field of transferred plasma arcs. Winterfeldt discloses a transferred plasma arc, but teaches that it is preferable that the exit portion of the nozzle is comprised of an electrically insulating ceramic – in stark contrast to the high heat resistant, electrically conductive metal of the present invention.

Because Winterfeldt and Muller do not teach or suggest the subject matter of the amended independent claims, Applicants submit that the rejections under Section 103 are overcome and/or should be withdrawn.

C. Dependent Claims

The dependent claims depend from amended independent claims 1 and 9 and are therefore even more clearly allowable. Claim 2 recites that the second material is tungsten or a tungsten alloy. Claim 3 recites that the second material forms at least a portion of the inner surface of the nozzle. Claim 4 recites that the second material is an insert secured within the nozzle body. Claim 6 recites that the second material is coated on the inner surface. Claim 10 recites that the plasma arc is transferred for cutting the workpiece. Claim 11 recites that the plasma arc is transferred for welding the workpiece. Claim 12 recites that the inner surface includes the layer of tungsten. Claim 13 recites that the layer of tungsten extends throughout the axial bore. Claim 14 recites that all of the nozzle body is comprised of tungsten. Claim 15 recites that the layer of tungsten is a thermal spray coating. Claim 16 recites that the tungsten is attached as a separate piece.

Applicants : Jiri Zapletal et al
Serial No. : 10/714,109
Page No. : 9


IV. Conclusion

In view of the interview, the above amendments, and these remarks, Applicants respectfully submit that the present invention is in condition for allowance. The Examiner is invited to contact the undersigned by telephone at the number listed below if additional changes are believed necessary.

Respectfully submitted,

JIRI ZAPLETAL ET AL

By: Warner Norcross & Judd LLP



Chad E. Kleinheksel
Registration No. 53 141
900 Fifth Third Center
111 Lyon Street, N.W.
Grand Rapids, MI 49503-2487
(616) 752-2313